QUEMERE DESIGNS

234 Middle Street
Middletown, CT 06457

914.934.8366
QuemereDesigns.com

Recommendations for Ceramic Tile Installation

This document has been created exclusively for QUEMERE DESIGNS INC. in partnership with the Ceramic Industry Research Association – Institute of Ceramic Technology (AICE-ITC), a center with a 50-year track record in research, testing, and training courses relating to ceramic materials and tiles.

Materials Used

The area in which tiles are going to be laid, the substrate on which tiles are installed, the presence of moisture, tile water absorption rate, and tile size determine which adhesives and materials are to be used in installing ceramic tiles.

In every case, manufacturers' recommendations regarding the preparation, application, and appropriate uses of their products shall be observed. If there is an error in area preparation, application, or usage of the material it can create problems in the ceramic tile installation system.

If you have any questions regarding which material to use, please contact quemere@quemeredesigns.com.

As you proceed through this document, please note that the technical recommendations in this document have been drawn up for ceramic tiles with a water absorption exceeding 10% and longest side length less than 38.1 cm (15"), the type of ceramic tiles made by Quemere Designs Inc.

Substrates

It is very important for substrates on which ceramic tiles are installed to be stable, i.e., to exhibit no dimensional variations once the ceramic tiles have been laid, nor any movements owing to vibrations or to the weight they bear. In addition, they shall also be dry and clean.

A concrete slab or floor can usually be deemed stable when deformation below L/360 is foreseen, where L is the length of the span between supporting elements, considering the structure's entire load as contributed by the use.

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In the case that substrates are not adequately dried/cured, they are subject to important thermal variations or vibrations, anti-crack or decoupling membranes should be used in the ceramic tile system. This is also the case if the substrate is not continuous or is cracked. The substrate's degree of water absorption and its dimensional variation with changes in temperature or the presence of water determine the ceramic tile fixing technique and adhesive materials used.

Generally speaking, materials that consist of concrete slab, portland cement mortar, or cement substrate are recommended.

Substrates with a certain porosity, i.e., which are stable and have a medium level of water absorption, enable the application of the thick-bed tile fixing technique, using Portland cement mortar as an adhesive. Examples of where this type of substrate is used are ceramic brick walls, floors with a mortar bed, and concrete slabs, provided sufficient time has been allowed to elapse for them to dry (for Portland cement mortar substrates at least 96 hours at temperatures of 21 ºC or higher). If using a Portland cement mortar is used as an adhesive on gypsum, a membrane should be installed.

Substrates with low water absorption, such as laminated gypsum plasterboard, natural stone, ceramic tiles themselves, and metal or wood, require the installation of organic or epoxy tile adhesives with the thin-bed technique. If the tile has very pronounced back relief, the adhesive application shall involve buttering and floating.

Wood-based panels are not recommended as substrates because they expand and shrink with moisture. Waterproof chipboard can be used in flooring. In such water-sensitive substrates, it is necessary to apply a primer or to install a waterproof membrane to prevent damage to the substrate and the appearance of problems in the ceramic system as a whole. Nor is gypsum board appropriate for wet areas.

Adhesives and Tile Fixing Technique

Tile fixing with the thick-bed technique, using Portland cement mortar as adhesive, is only appropriate to be used in dry environments in which there is usually no moisture.

The cement mortar layer shall be evenly spread and equal to or less than ¾ inch (19 mm) thick for vertical surfaces and, at most, 1 and ¼ inch (32 mm) thick in flooring. If the substrate is not level and requires larger adhesive thickness at certain points, a cement mortar leveling or a regularization layer should be installed before adding adhesive. If cement mortar is used as an adhesive, it is recommended to soak the tiles beforehand for 30 minutes.

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When using a tile adhesive that contains a cementitious, organic, or epoxy base, the thin-bed tile fixing technique is recommended, this includes applying the adhesive directly on the substrate with a notched trowel of tooth size 6x6 mm. The grooves shall be flattened such that the adhesive is spread uniformly and makes contact with the largest possible surface area of the tile back.

The thin-bed tile fixing technique always requires having a level substrate, with a maximum variation of ¼ inch in 10 feet (6 mm in 3 m). When buttering and floating are performed, the minimum possible amount of adhesive is applied on the tile back, while ensuring the tile back is fully covered with adhesive.

Generally speaking, in dry places, 80% of the tile back needs to be in contact with the adhesive. In wet places, it must be at least 95%.

It is very important for adhesive thickness to be uniform throughout and no thicker than necessary to ensure the greatest possible contact between adhesive, substrate, and ceramic tile. Voids under a tile or very large adhesive thicknesses can cause different problems in the tile, such as fractures, curvature, heterogeneous hairline cracks in the glaze, or a defect known as crazing. If the tile is laid with excessively dry adhesive, over time tiles can debond from walls and lift from floors. The ideal consistency of the adhesive at the time of installation should be similar to peanut butter,

Joints

Ceramic tiles are always installed with grout joints between each tile. The grout joint width shall be at least 1.5 mm and should be filled with the specific grout (grouting nozzle) required for the intended use and applied with a foam or rubber grout float for the nozzle application. Nozzle appearance shall be uniform, without any holes or bubbles.

Allow at least 24 hours from the time the tile is installed to the nozzle application. The grout joints shall be filled with the appropriate material for the intended use.
In surfaces larger than 16mm, two movement joints shall also be installed.

For abutments between walls, floor and wall, and wall and ceiling, joints should be at least 6mm wide and shall be filled with appropriate elastic materials.

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Cleaning

It is very important to carefully clean grout residue after installation following the manufacturer's instructions. Inadequate cleaning can alter the final appearance of the tile, facilitating dirt retention and adversely affecting regular cleaning of the installed tiles.

In general, grout residues can be removed well with a damp sponge and it should not be necessary to use more aggressive acid products. If aggressive products are used, it is necessary to follow the instructions for the use of these products and test them on a small area of tile before using them across the entire installation area.

Regular cleaning of the tile should be done with water and pH-neutral detergents that cannot damage the tile. It is recommended to clean without leaving a pool of water on the tile surface. Do not use abrasive mechanical cleaning methods that may damage the tiles or grout. If stains occur on the installation area; they should be cleaned with appropriate products for the type of stain involved, always after performing a preliminary test on a small area.

Final Check

A proper final finish involves a clean surface, keeping the original gloss of the ceramic tiles, with a uniform grout joint pattern, filled with grout. It shall exhibit a maximum variation in total surface level of 6.35 mm for each 3.048 m (¼" for each 10´), respecting the slope required to drain water from the floor, with an allowable lippage between adjacent tiles of 0.794 mm (1/32") for joint widths from 1.588 to 6.5 mm (1/16" to ¼").

For further questions, please email quemere@quemeredesigns.com.